one in the sun, and the other in the shade, disturbing influences being as much as possible avoided in both cases, and the observations being confined to those days on which the sun shone sufficiently clearly to cast a distinct shadow during some part of the interval between noon and 4 P.M. Comparing the differences of insolation in different parts of India and in different seasons, he is led to regard insolation as dependent greatly on relative humidity. Thus, generally speaking, it is greater on the seaboard than in the interior of India. At individual stations, the maxima of insolation occur on days of great relative moisture, *i. e.* on days in the rainy season when the clouds are temporarily broken, or in the months immediately following the rainy season, when the atmosphere is still very humid. Calcutta and Columbo are taken as types of a sea-climate, Konagheri and Bellori as types of an interior or very dry climate. In the one type the relative humidity is from 88 to 93, the insolation 50°; whilst in the other type the relative humidity is from 60 to 65, and the insolation from 8° to 11°. Still more striking results are obtained by comparing the mountain climates of Sikkim and Ladak, nearly at similar absolute altitudes. At Ladak the relative humidity is about 30, and the insolation about 18°; whilst in Sikkim the relative humidity is estimated at from 81 to 84, and the insolation from 60° to 75°. The contrasts in these comparisons are very great, and, with other examples, which are cited, appear to substantiate a connexion between the presence of aqueous vapour in its transparent state, and insolation as measured by the differences of thermometers in the sun and shade. The connexion is shown to be in perfect harmony with the results obtained by Professor Tyndall, and is explained by considering simultaneously the gain of heat which the thermometer experiences by direct radiation from the sun, and its loss of heat by radiation to the surrounding air. The opacity of the air for the invisible heat radiating from the thermometer rapidly increases with the amount of vapour of water which the air contains, while its transparency for the heat directly radiated from the sun is *comparatively* little affected. Thus when the air is highly charged with moisture, free radiation from the thermometer is much impeded; or rather, what the thermometer loses by radiation into the air is in some measure restored by radiation back again from the air.

II. "On the Structure and Development of the Skull of the Ostrich Tribe." By WILLIAM KITCHEN PARKER, Esq. Communicated by Prof. T. H. HUXLEY. Received February 23, 1865.

(Abstract.)

The earliest condition of the struthious skull described by the author is that of a "pullus" of the African species, at about the end of the first third of the period of incubation. There are two individuals in this stage

from the stores of the Hunterian Museum * ; and two others also, twice as perfect, from the same source ; of these, one was more advanced than the other.

Next to these, in point of growth, is a young Freckled Emu (*Dromœus irroratus*, Scl.) ; this wanted one week of the full period.

The young of the Nandu (*Rhea*) were all ready for hatching, but died in the process : these chicks had the long-billed kind (*R. macrorhyncha*, Scl.) for their sire, but their dam was of the ordinary kind, viz. *R. americana*. Dr. Bennett's beautiful Cassowaries, the "Mooruks," have yielded two ripe pulli ; these were both hatched alive at the Society's Gardens. The author has been able to give the condition of the Emu's skull at six weeks old, also at two months, at half a year, and likewise in the adult state.

The skull of the adult *Dinornis* is also described ; and the so-called *Dinornis casuarinus* is shown to be a gigantic *Porphyrine* Rail.

The writer is indebted to M. Blanchard's work (L'Organisation du Règne Animal) for a knowledge of the condition of the skull of the immature *Apteryx*.

The Tinamous (*Tinamus robustus* and *T. variegatus*) were both old birds ; but their skulls are rich in persistent sutures, and in bones which, although common amongst the cold-blooded classes, are rare enough amongst birds. Moreover naturalists have misplaced the Tinamous, by putting them with the "Gallinaceæ."

In this paper the bones formed in *membrane* merely, and those formed by the metamorphosis of true or hyaline *cartilage* are carefully distinguished ; moreover the relation of the parts is displayed by sections made in various directions.

The figures are nearly all magnified, and they are coloured in a map-like manner, so as to display, by an exaggeration of the natural tints, the histological condition of the various parts of the skull and face at each stage.

The nomenclature of the parts is, on the whole, in harmony with that adopted by Professor Huxley in his recent work on Comparative Anatomy ; but there are several new terms †, for which the author is responsible ; they were imperatively called for, or they would not have been coined, and they are as much like the old human-anatomy names as possible. In this paper it is shown that the Ostriches are, on the whole, inferior to Birds generally, and yet that they come nearer to the Mammalia than the higher types ; they are compared to the Cartilaginous *Fishes*, to the Amphibious *Reptiles*, and to the Marsupial and Monotrematous *Mammalia*.

After a minute description of the struthious type of skull, an "Ap-

* The young African ostriches were lent to me by the Council of the College, through the intercession of my kind friend Mr. W. H. Flower, the Conservator of the Museum. Most of my specimens of the other kinds I owe to Dr. Sclater and Mr. Bartlett ; they came from the Gardens of the Zoological Society.—W. K. P.

† Most of these terms have already appeared in print in the author's paper on the "Gallinaceæ and Tinamous" (Trans. Zool. Soc. vol. v., 1864).

pendix" is given; and here the author takes occasion to describe much earlier stages of the skull in typical birds, viz. in the Crows. The primordial parts of the facial arches are carefully compared, beginning at the lowest Fishes, and ascending to the Mammalia; the pattern and *habit* of growth of the facial structures in the higher classes is shown to be adumbrated by the condition of these parts in the Lamprey (*Petromyzon*). The essential independence of the two arches in front of the mouth is asserted, and their low type of development is shown in the non-segmentation of the parts that should answer to the free *post*-stomal rays, the mandible, and the hyoid arch.

A survey is also made of the system of secondary bones—bones which have no preexistent hyaline cartilage as their basis; and these are shown to pass insensibly into dermal plates: the only distinction that can be made, viz. into *dermal, subcutaneous,* and *aponeurotic bones,* is there explained to be merely *useful,* but not to have anything embryologically essential in it.

March 16, 1865.

Major-General SABINE, President, in the Chair.

Pursuant to notice given at the last Meeting, Dr. Watson proposed, and Dr. Sharpey seconded, the Right Honourable Lord Justice Turner for election and immediate ballot.

The ballot having been taken, Lord Justice Turner was declared duly elected a Fellow of the Society.

The following communication was read:—

"On the Magnetic Character of the Armour-Plated Ships of the Royal Navy, and on the effect on the Compass of particular arrangements of Iron in a Ship." By FREDERICK JOHN EVANS, Staff-Commander R.N., F.R.S., Superintendent of the Compass Department H.M. Navy, and ARCHIBALD SMITH, M.A., F.R.S., Corresponding Member of the Scientific Committee of the Imperial Russian Navy. Received March 9, 1865.

(Abstract.)

This paper contains a reduction and discussion of all the observations of deviation and of horizontal and vertical force made in the armour-plated ships of the Royal Navy, and also in certain iron-built ships of the Royal Navy and of the mercantile marine. It may be considered as a continuation of a paper on the Deviation of the Compass in iron-built ships of the Royal Navy, by Staff Commander Evans, published in the Phil. Trans. for 1860, p. 337.

The reduction gives the numerical values of the several parts of the